

Table 5

Author, date and country	Patient group	Study level	Outcomes	Key results	Study weaknesses
Brandjes D, <i>et al</i> , 1997, Holland <sup>1</sup>	194 consecutive patients with a first episode of proximal DVT (proved on venogram).  Custom fitted graduated compression stockings (96), <i>v</i> no stockings (98). Assessment every 3 months for 2 years, and thereafter every 6 months for at least 5 years.	PRCT	Incidence of PTS  PTS was assessed using clinical characteristics and leg measurements	Mild to moderate PTS occurred in 19 patients in the stocking group and in 46 patients in the control group ( $p \leq 0.001$ )  11 patients in the stocking group developed severe PTS compared with 23 in the control group ( $p \leq 0.001$ )	Due to the non blinded design, potential bias in the assessment of post-thrombotic syndrome Lack of an accepted definition of PTS

wonder whether this young woman would benefit from the use of compression stockings.

### Three part question

In [patients with confirmed deep vein thrombosis] does [the use of compression stockings] reduce [the risk of post-thrombotic syndrome]?

### Search strategy

Medline 1966–07/00 using the OVID interface. {(Exp.thrombosis OR venous thrombosis OR thrombosis.mp) AND (exp.stockings.mp) OR TED stockings.mp OR support stockings.mp OR exp. compression stockings.mp OR graduated compression stockings.mp). LIMIT to english language AND human.

### Search outcome

Altogether 19 papers were found of which 18 were irrelevant or of insufficient quality for

inclusion. The remaining paper is shown in table 5.

### Comments

The incidence of PTS following confirmed DVT is unknown but it has been reported to be between 20% and 100%. This wide range probably reflects the small size of these retrospective studies with different periods of follow up and selection criteria. Interpretation of the findings from these studies is also hampered by the lack of objective diagnostic criteria for PTS.

### Clinical bottom line

Elastic compression stockings should be used within two weeks of onset of acute thrombotic event and worn for up to two years.

<sup>1</sup> Brandjes D, Buller H, Heijboer ??, *et al*. Randomised trial of effect of compression stockings in patients with symptomatic proximal vein thrombosis. *Lancet* 1997;349:759–62.

## Prior injection of local anaesthetic and the pain and success of intravenous cannulation

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### Clinical scenario

A 45 year old woman attends the emergency department with cellulitis. You decide to admit her for intravenous antibiotics. She becomes agitated, distressed and tearful when you explain this to her. On questioning she reveals that she is afraid of the pain of intravenous cannulation. You wonder whether a prior injection of local anaesthetic would lessen the pain of cannulation without affecting your chances of success.

### Three part question

In [a patient requiring intravenous cannulation] will [a prior injection of local anaesthetic] reduce [the pain of cannulation without effecting the chance of successful cannulation]?

### Search strategy

Medline 1966–07/00 using the OVID interface. [Venflon.mp OR cannula.mp or exp cath-

eterization, peripheral OR exp infusions, intravenous OR exp injections, intravenous] AND [local anaesthetics.mp OR exp anaesthetics, local OR exp bupivacaine OR exp lidocaine OR exp procaine OR exp tetracaine] AND [pain.mp OR exp pain]. LIMIT to human and english language AND abstracts.

### Search outcome

Altogether 251 papers were found of which 241 were irrelevant or of insufficient quality for inclusion. The remaining 10 papers are shown in table 6.

### Comments

These studies do indicate that a prior injection of local anaesthetic lessens the pain of intravenous cannulation without affecting the chances of successful cannulation. However, none of the trials were fully blinded and most were not properly single blinded. One used a placebo control and only one reported side effects. While the results were statistically significant it is not known if they were clinically significant and few of the trials commented on the increased length of time it takes to administer anaesthetic or the cost to the health service. Although different anaesthetics were used in different studies most concen-

Table 6

Author, date and country	Patient group	Study type	Outcomes	Key results	Study weaknesses
Harrison N, <i>et al</i> , 1991, UK <sup>1</sup>	60 patients for surgery Cannulation with 18G or 20G or 22G venflon on one arm <i>v</i> injection with 1% sub-cut lignocaine with a 25G needle on other arm.	Clinical trial Randomised Blinded	Pain using visual analogue scales	Cannulation significantly more painful than lignocaine injection in all groups	Some patients were pre-medicated
Langham BT and Harrison DA, 1992, UK <sup>2</sup>	60 patients for surgery Double cannulation with 18G, 20G or 22G venflons preceded by an injection of 1% sub-cut lignocaine with 25G needle on one arm <i>v</i> nothing on the other	Clinical trial Randomised Blinded	Pain using visual analogue scales	Cannulation without lignocaine significantly more painful than cannulation with lignocaine	Some patients were pre-medicated
Nuttall GA, <i>et al</i> , 1993, USA <sup>3</sup>	280 patients for surgery Cannulation with 18G venflon preceded by nothing <i>v</i> injection with 25G needle of 0.9% benzyl alcohol or 3% 2-chloroprocaine or 1% lignocaine or 1% lignocaine with preservative or 1% alkalised lignocaine with preservative or normal saline	Clinical trial Randomised Double blinded Controlled	Pain using visual analogue scales	Cannulation without anaesthetic significantly more painful than cannulation with anaesthetic  Alkalised lignocaine had the lowest mean pain score for cannulation	
Selby IR and Bowles BJ, 1995, UK <sup>4</sup>	160 patients for surgery Cannulation with 20G venflon preceded by nothing <i>v</i> cannulation preceded by EMLA or ethyl chloride spray or 1% sub-cut lignocaine injected with 25G needle.	Clinical trial Randomised	Pain on anaesthetic application, cannulation and a minute afterwards using visual analogue scales Number of failed cannulations	Cannulation without lignocaine significantly more painful than lignocaine injection No significant difference in number of failed cannulations	Not blinded. Did not compare pain of whole procedure
Van den Berg AA, <i>et al</i> , 1995, USA <sup>5</sup>	278 patients for surgery Cannulation with 21G butterfly <i>v</i> 23G butterfly <i>v</i> 20G venflon <i>v</i> injection with 1% sub-cut lignocaine with 25G needle prior to cannulation with a venflon of any size	Clinical trial Randomised Blinded	Pain Subjectively using observation and objectively using visual analogue scales	Cannulation with 20G venflon and 21G butterfly significantly more painful than cannulation with 23G butterfly and anaesthetic injection before cannulation	Single blinded
Klein EJ, <i>et al</i> , 1994, USA <sup>6</sup>	59 children requiring cannulation in emergency department Cannulation with 18–24G venflons preceded by nothing <i>v</i> cannulation preceded by injection with 27G needle of sub-cut buffered lignocaine	Clinical trial Randomised	Pain of entire procedure using visual analogue scales  Number of attempts preceding successful cannulation	Cannulation without lignocaine significantly more painful than cannulation with lignocaine regardless of venflon size No significant difference in number of attempts	Not blinded. Small sample size with wide confidence intervals
Sacchetti AD, <i>et al</i> , 1996, USA <sup>7</sup>	110 children under 2 years requiring cannulation in emergency department Cannulation with 24G venflon preceded by nothing <i>v</i> cannulation preceded by injection with 27–29G needle of sub-cut lignocaine	Clinical trial	Number of attempts preceding successful cannulation	No significant difference between groups	2 groups entered into study over 2 different periods. Not blinded. Not randomised
Burgher SW, <i>et al</i> , 1998, UK <sup>8</sup>	103 patients requiring cannulation in emergency department Cannulation with 18G venflon preceded by nothing <i>v</i> cannulation preceded by injection with 27G needle of sub-cut buffered lignocaine or sub-cut 0.9% benzyl alcohol and normal saline	Clinical trial Randomised Blinded	Pain of anaesthetic injection and cannulation using visual analogue scales  Number of attempts before successful cannulation and number of successful cannulations on the first attempt	Cannulation without lignocaine significantly more painful than lignocaine injection and significantly more painful than cannulation with lignocaine No significant difference in number of attempts or success rate	Patients entered into study when investigators available and department not too busy. Did not compare pain of whole procedure
Fein JA, <i>et al</i> , 1998, USA <sup>9</sup>	99 children requiring cannulation in emergency department Cannulation with 18–24G venflons preceded by nothing <i>v</i> cannulation preceded by injection with 27G needle of sub-cut lignocaine or benzyl alcohol and normal saline	Clinical trial Randomised	Pain using visual analogue scales	Cannulation without lignocaine significantly more painful than cannulation with lignocaine regardless of venflon size	Patients entered into study when investigators available
Holdgate A, <i>et al</i> , 1999, Australia <sup>10</sup>	166 patients requiring cannulation in emergency department Cannulation preceded by nothing <i>v</i> cannulation preceded by injection with 25G needle of sub-cut 1% lignocaine	Clinical trial Randomised	Successful cannulation at first attempt	No significant difference between groups	Not blinded. Venflon size not considered

trated on 1% lignocaine. Previous studies have shown that the pain of injection of local anaesthetic is less when it is warmed and buffered with bicarbonate and in order to achieve best results this is how lignocaine should be administered prior to attempted cannulation.

#### Clinical bottom line

A prior injection of local anaesthetic does reduce the pain of intravenous cannulation without affecting the success.

<sup>1</sup> Harrison N, Langham BT, Bogod DG. Appropriate use of local anaesthetic for venous cannulation. *Anaesthesia* 1992;47:210–12.

- 2 Langham BT, Harrison DA. Local anaesthetic: Does it really reduce the pain of insertion of all sizes of venous cannula? *Anaesthesia* 1992;47:890–91.
- 3 Nuttall GA, Barnett MR, Smith RL, *et al.* Establishing intravenous access: A study of local anaesthetic efficacy. *Anaesth Analg* 1993;77:950–3.
- 4 Selby IR, Bowles BJ. Analgesia for venous cannulation: A comparison of EMLA, lignocaine, ethyl chloride and nothing. *J R Soc Med* 1995;88:264–7.
- 5 Van den Berg AA, Prabhu Rama NV. Rationalising venepuncture pain: Comparison of lignocaine injection, butterfly and venflon. *Anaesth Intens Care* 1995;23:165–7.
- 6 Klein EJ, Shugerman RP, Leigh-Taylor K, *et al.* Buffered lidocaine: Analgesia for intravenous line placement in children. *Pediatrics* 1995;95:709–12.
- 7 Sacchetti AD, Carraccio C. Subcutaneous lidocaine does not affect the success rate of intravenous access in children less than 24 months of age. *Acad Emerg Med* 1996;3:1016–19.
- 8 Burgher SW, McGuirk TD. Subcutaneous buffered lidocaine for intravenous cannulation: Is there a role in emergency medicine? *Acad Emerg Med* 1998;5:1057–63.
- 9 Fein JA, Boardman CR, Stevenson S. Saline with benzyl alcohol as intradermal anaesthesia for intravenous line placement in children. *Pediatr Emerg Care* 1998;14:119–22.
- 10 Holdgate A, Wong G. Does local anaesthetic affect the success rate of intravenous cannulation? *Anaesth Intens Care* 1999;27:257–9.